



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

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Secretary

ROBERT W. GOLLEDGE, Jr.
Commissioner

APPROVAL FOR REMEDIAL USE
Pursuant to Title, 310 CMR 15.00

Name and Address of Applicant:

Knight Treatment Systems
281 County Route 51A
Oswego, NY 13126

Trade name of technology: White Knight Inoculator/Generator Alternative Treatment System (hereinafter called the "System"). Schematic drawing of a typical System and Technology checklist are attached and are a part of this Approval.

Transmittal Number: W 036345
Date of Issuance: October 19, 2004
Expiration date: October 19, 2009

Authority for Issuance

Pursuant to Title 5 of the State Environmental Code, 310 CMR 15.000, the Department of Environmental, Protection hereby issues this Approval for Remedial Use to: Knight Treatment Systems, 281 County Route 51A, Oswego, NY 13126(hereinafter "the Company"), approving the System described herein for Remedial Use in the Commonwealth of Massachusetts. Sale and use of the System are conditioned on compliance by the Company and the System owner with the terms and conditions set forth below. Any noncompliance with the terms or conditions of this Approval constitutes a violation of 310 CMR 15.000.

SIGNED

Glenn Haas, Director
Division of Watershed Management
Department of Environmental Protection

October 19, 2004
Date

This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator at 617-556-1057. TDD Service - 1-800-298-2207.

DEP on the World Wide Web: <http://www.mass.gov/dep>

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I. Purpose

1. The purpose of this approval is to allow use of the System in Massachusetts, on a Remedial Use basis to repair systems failing to protect public health and safety and the environment where failure has occurred as described in 310 CMR 15.303 (1) (a) (1) and (2) due to clogging of the soil absorption system (SAS).
2. With the necessary permits and approvals required by 310 CMR 15.000, this Approval for Remedial Use authorizes the use and installation of the System in Massachusetts.
3. The System may only be installed on facilities that meet the criteria of 310 CMR 15.284(2).
4. This Approval for Remedial Use authorizes the use of the System where the local approving authority finds that the System is for upgrade of a failed, failing or nonconforming system and the design flow for the facility is less than 2,000 gallons per day (GPD).

II. Design Standards

1. The System consists of an microbial inoculator/generator consisting of: a linear air pump operated on a continuous basis and capable of providing 1.5 to 2.5 cfm of air; a bacterial inoculant is placed into the system in a sealed geotextile bag; and a fine bubble diffuser. The unit is installed in an existing septic tank or a new septic tank designed in accordance with 310 CMR 15.223 through 15.228 with an effluent tee filter. The System converts the septic tank into a bioreactor to treat residential strength wastewater from facilities with a design flow of less than 2,000 GPD. The treated effluent is discharged to either the existing soil absorption system or to a new SAS designed and installed in accordance with 310 CMR 15.000.
2. A microbial culture is established and maintained using the mixing and aeration device and the bacterial source. The aerator mixes the contents of the septic tank with the bacteria and aerates the liquid. The System's biomass reduces both the biochemical oxygen demand (BOD₅) and the total suspended solids (TSS) concentration in the effluent from the septic tank. The effluent from the septic tank contains dissolved oxygen (DO) and bacteria that discharge to the SAS and act to reduce the thickness of the biomat improving the soil absorption capacity.
3. Prior to installation of the System, the site shall be evaluated in accordance with 310 CMR 15.100 through 15.107. The existing on-site system including the septic tank, distribution box and SAS shall be inspected in accordance with 310 CMR 15.302.
4. No System shall be proposed for installation where:

- A. The high groundwater elevation will be less than two feet below the bottom of the SAS.
 - B. A facility for which the site investigation indicates that the existing onsite system was designed and installed for a design flow smaller than required by 310 CMR 15.203 unless the onsite system is expanded to meet the current design flow requirements of Title 5. The minimum area for the existing or upgraded SAS shall not be less than 50 percent of the area required in accordance with 310 CMR 15.242.
 - C. An existing septic tank is not tested and shown to be watertight.
 - D. The proposed installation is for a failed or failing leaching pit or cesspool.
5. The System shall be equipped with a monitoring device that provides data collection to include tracking the elevation of the effluent in the SAS. The data can be stored and reported to include high, low and average levels for each parameter each month and daily values for the last thirty days.
6. For seasonal use, the System shall be reactivated by the addition of a fresh culture of bacteria at each start up.

III. Allowable Soil Absorption System Design

1. Reduction of the Required Soil Absorption System Size - An applicant is eligible for up to a 50 percent reduction in the area of the soil absorption system required by 310 CMR 15.242, where all of the following conditions are met. Accordingly, in approving design and installation of the System by a particular Applicant, the local approving authority may allow up to a 50 percent reduction in the area of the soil absorption system required by 319 CMR 15.242, provided that all of the following conditions are met:
- A. No reduction in the required separation (four feet in soils with a recorded percolation rate of more than two minutes per inch or five feet in soils with a recorded percolation rate of two minutes or less per inch) between the bottom of the stone underlying the SAS and the high groundwater elevation is allowed unless such a reduction is first approved by the local approving authority and then approved by the Department pursuant to 310 CMR 15.284.
 - B. No reduction in the required four feet of naturally occurring pervious material is allowed unless the Applicant has demonstrated that the four foot requirement cannot be met anywhere on the site. Any such reduction must first be approved by the local approving authority and then approved by the Department pursuant to 310 CMR 15.284.
 - C. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, the local approving authority may allow a reduction under a local upgrade approval in accordance with 310 CMR 15.405 (1) (a), (b), (f), (g), and (h).

- D. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, even taking into account provisions for local upgrade approval as described above, then pursuant to 310 CMR 15.410, the applicant first must obtain variance(s) from the local approving authority and then approval of the Department.
2. Reduction of the Required Separation Distance to High Groundwater Elevation - An Applicant is eligible for a reduction in separation (four feet in soils with a recorded percolation rate of more than two minutes per inch or five feet in soils with a recorded percolation rate of two minutes or less per inch) between the bottom of the stone underlying the SAS and the high groundwater elevation, where all of the following conditions are met. Accordingly, in approving design and installation of the System by a particular Applicant, the local approving authority may allow a reduction in the required separation (four feet in soils with a recorded percolation rate of more than two minutes per inch or five feet in soils with a recorded percolation rate of two minutes or less per inch) between the bottom of the stone underlying the SAS and the high groundwater elevation, provided that all of the following conditions are met:
- A. A minimum two foot separation (in soils with a recorded percolation rate of more than two minutes per inch) or a minimum three foot separation (in soils with a recorded percolation rate of two minutes or less per inch) between the bottom of the stone underlying the SAS and the high groundwater elevation is maintained.
 - B. No reduction in the required SAS size is allowed unless such a reduction is first approved by the local approving authority and then approved by the Department pursuant to 310 CMR 15.284.
 - C. No reduction in the required four feet of naturally occurring pervious material is allowed unless the Applicant has demonstrated that the four foot requirement cannot be met anywhere on the site. Any such reduction must first be approved by the local approving authority and then approved by the Department pursuant to 310 CMR 15.284.
 - D. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, the local approving authority may allow a reduction under a local upgrade approval in accordance with 310 CMR 15.405 (1) (a), (b), (f), (g), and (h).
 - E. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, even taking into account provisions for local upgrade approval as described above, then pursuant to 310 CMR 15.410, the applicant first must obtain variance(s) from the local approving authority and then approval of the Department.
3. Reduction of the Requirement for Four Feet of Naturally Occurring Pervious Material – An Applicant is eligible for a reduction in the required four feet of naturally

occurring pervious material in an area of no less than two feet of naturally occurring pervious material, where all of the following conditions are met. Accordingly, in approving design and installation of the System by a particular Applicant, the local approving authority may allow a reduction in the required four feet of naturally occurring pervious material in an area with no less than two feet of naturally occurring pervious material, provided that all of the following conditions are met:

- A. The Applicant has demonstrated that the four foot requirement cannot be met anywhere on the site. No reduction in the required SAS size is allowed unless such a reduction is first approved by the local approving authority and then approved by the Department pursuant to 310 CMR 15.284.
- B. No reduction in the required separation (four feet in soils with a recorded percolation rate of more than two minutes per inch or five feet in soils with a recorded percolation rate of two minutes or less per inch) between the bottom of the stone underlying the SAS and the high groundwater elevation is allowed unless such a reduction is first approved by the local approving authority and then approved by the Department pursuant to 310 CMR 15.284.
- C. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, the local approving authority may allow a reduction under a local upgrade approval in accordance with 310 CMR 15.405 (1) (a), (b), (f), (g), and (h).
- D. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, even taking into account provisions for local upgrade approval as described above, then pursuant to 310 CMR 15.410, the applicant first must obtain variance(s) from the local approving authority and then approval of the Department.

IV. General Conditions

- 1. All provisions of 310 CMR 15.000 are applicable to the use of this System, the System owner and the Company, except those that specifically have been varied by the terms of this Approval.
- 2. Any required sample analysis shall be conducted by an independent U.S. EPA or DEP approved testing laboratory, or a DEP approved independent university laboratory. It shall be a violation of this Approval to falsify any data collected pursuant to an approved testing plan, to omit any required data or to fail to submit any report required by such plan.
- 3. The facility served by the System and the System itself shall be open to inspection and sampling by the Department and the local approving authority at all reasonable times.

4. In accordance with applicable law, the Department and the local approving authority may require the owner of the System to cease operation of the system and/or to take any other action as it deems necessary to protect public health, safety, welfare and the environment.
5. The Department has not determined that the performance of the System will provide a level of protection to public health and safety and the environment that is at least equivalent to that of a sewer system. No System shall be installed, upgraded or expanded, if it is feasible to connect the facility to a sanitary sewer, unless as allowed by 310 CMR 15.004. When a sanitary sewer connection becomes feasible, the facility served by the System shall be connected to the sewer, within 60 days of such feasibility, and the System shall be abandoned in compliance with 310 CMR 15.354, unless a later time is allowed, in writing, by the approving authority.
6. Design, installation and operation shall be in strict conformance with the Company's DEP approved plans and specifications, 310 CMR 15.000 and this Approval.

V. Conditions Applicable to the System Owner

1. The System is approved for the treatment and disposal of sanitary sewage only. Any wastes that are non-sanitary sewage generated or used at the facility served by the System shall not be introduced into the System and shall be lawfully disposed.
2. Any effluent samples shall be taken from within the center tube of the OSI filter installed in on each system or the pipe entering a pump chamber or other Department approved location. Any required influent sample shall be taken at a point that will provide a representative sample of the influent. Influent sampling locations shall be upstream of the septic tank at a location determined by the system designer, subject to written approval by the Department
3. Operation and Maintenance Agreement:
 - A. Throughout its life, the System owner shall operate and maintain the System in accordance with the Company and designer's operation and maintenance requirements and this Approval. To ensure proper operation and maintenance (O&M), the System owner shall enter into an O&M agreement. No O&M agreement shall be for less than one year.
 - B. No System shall be used until an O&M agreement is submitted to the approving authority which:
 - a. Provides for the contracting with the Company or its approved management company, trained by the Company as provided in Section VI (6), to operate the System consistent with the System's specifications and the operation and maintenance requirements specified by the designer and any specified by the Department;

- b. Contains procedures for notification to the Department and the local board of health within five days of a System failure or alarm event and for corrective measures to be taken immediately;
 - c. Provides the name of an operator, which must be a Massachusetts certified operator if one is required by 257 CMR 2.00, that will operate and monitor the System. The operator must inspect the System at least every three months and anytime there is an alarm event.
4. The System owner shall at all times have the System properly operated and maintained in accordance with this Approval, the designer's operation and maintenance requirements and the Company's approved operating procedures. The System owner shall notify the Department and the local approving authority in writing within seven days of any cancellation, expiration or other change in the terms and/or conditions of their O&M agreement.
5. Prior to transferring any or all interest in the property served by the System, or any portion of the property, including any possessory interest, the System owner shall provide written notice of all conditions contained in this Approval to the transferee(s). Any and all instruments of transfer and any leases or rental agreements shall include as an exhibit attached thereto and made a part thereof a copy of this Approval for the System. The System owner shall send a copy of such written notification(s) to the local approving authority within 10 days of such notice being given.
6. The System shall be monitored quarterly for depth of ponding and DO in the SAS. Should the System exhibit excessive ponding levels after 180 days or six months of operation (water surface elevation equal to or greater than the water surface elevation prior to installation of the System), at a minimum, the following parameters shall be monitored: pH, BOD₅, TSS, depth of effluent and DO in the SAS and water use. Monitoring shall continue for at least one year when at the written request of the System owner, the Department may reduce the monitoring and reporting requirements.
7. By January 31st of each year for the previous year, the System owner in coordination with the Company or its designee shall submit to the approving authority all data collected in accordance with item 6, above, and an O&M checklist and a technology checklist, completed by the System operator for each inspection performed during the previous calendar year.
8. Prior to the issuance of a Certificate of Compliance for the System, the System owner shall record and/or register in the appropriate Registry of Deeds and/or Land Registration Office, a Notice disclosing the existence of the alternative system subject to this Approval on the property. If the property subject to the Notice is unregistered land, the Notice shall be marginally referenced on the owner's deed to the property. Within 30 days of recording and/or registering the Notice, the System owner shall submit the following to the local approving authority: (i) a certified Registry copy of the Notice bearing the book and page/instrument number and/or document number; and (ii) if the property is unregistered land, a Registry copy of the owner's deed to the property, bearing the marginal reference.

VI. Conditions Applicable to the Company

1. The Company shall develop and submit to the Department within 60 days of the effective date of this Approval: minimum site evaluation criteria and installation requirements; an operating manual, including information on substances that should not be discharged to the System; a technology checklist; and a recommended schedule for maintenance and replacement of the plastic media essential to consistent successful performance of the installed Systems. The Company shall develop and submit to the Department within 60 days of the effective date of this Approval a standard protocol essential for consistent and accurate measurement of the performance of installed Systems, including procedures for sample collection and analysis of the System effluent and for evaluating effluent depth in the SAS. The sampling and analysis protocol shall be in accordance with the latest edition of Standard Methods for the Examination of Water and Wastewater. The Company shall make available, in print and electronic format, the referenced procedures and protocol above to owners, operators, designers and installers of the System. The Company shall submit to the Department within 60 days of the effective date of this Approval a complete manual on operation of the SAS monitoring unit and the procedures that shall be implemented to conduct monitoring of the Systems and any procedures that will be implemented should the monitoring System fail.
2. By January 31st of each year, the Company shall submit a report to the Department, signed by a corporate officer, general partner or Company owner that contains information on the System, for the previous calendar year. The report shall include the following information:
 - A. The total number of units of the System sold for use in Massachusetts during the previous year; the address of each installed System, the owner's name and address, the type of use (e.g. residential, commercial, institutional), the design flow and date when system was installed and started up;
 - B. Tabulation of the sampling parameters and results with backup inspection and laboratory sheets;
 - C. Statistical analysis of the sampling results including but not limited to average and mean values; status of the SAS including depth of effluent and change in depth over the operating year;
 - D. Tabulation of systems that are in failure as described in 310 CMR 15.303 (1)(a)(1) or (2) due to excessive ponding of effluent in the SAS, reasons for non-compliance and any corrective action taken including but not limited to design, installation and/or operation or maintenance changes required to reach compliance;
 - E. The inspection results recorded on a Department approved inspection form and a technology checklist. The forms must be completed by the System operator and submitted to the Department with the annual report.

- F. A general summary of the results for the year, any recommended changes to the design, installation and/or operation and maintenance procedures and a schedule for implementing those changes; and
 - G. Warranty issues both resolved and unresolved or an explanation of any warranty claims that have been received and their resolution.
- 3. The Company or its designee shall review the plans and site evaluation conducted for the System prior to the sale of any unit to ensure that the proposed installation of the System is at a site consistent with this Approval and the System's capabilities. The Company or its designee shall certify in writing that the System plan and existing site conditions conform to the requirements of this Approval and any requirements of the Company and shall submit a copy of that certification to the local approving authority and the System owner.
- 4. Prior to the issuance of a Certificate of Compliance for the System, the Company or its designee shall submit to the local approving authority and the System owner a signed certification that the System has been installed in accordance with the Company's requirements, the approved plan and this Approval. This certification in no way changes the requirements of 310 CMR 15.021(3).
- 5. The Company or the Company's approved operation and maintenance contractor shall maintain a contract with the System owner that:
 - A. Provides for operating and maintaining the System with an operator that has been trained by the Company to operate the System consistent with the System's specifications and any additional operation and maintenance requirements specified by the designer or by the Department;
 - B. Contains procedures for notification to the System owner, the Department and the local approving authority within five days of knowledge of a System failure and for corrective measures to be taken immediately;
 - C. Contains procedures for inspecting the plastic media with the bacterial source at each quarterly visit and if necessary replacing the media. At a minimum, the microbial inoculant shall be replaced annually; and
 - D. Contains a plan to determine after the first three months of operation why the effluent water surface elevations in the SAS are as high or higher than the water surface elevation when the System was installed.
- 6. The Company shall institute and maintain a program of operator training and continuing education, as approved by the Department. The Company shall maintain and annually update, and make the list of qualified operators available by February 1st of each year. The company shall update the list of qualified operators and make the list known to users of the technology.
- 7. The Company shall provide to each System owner a written warranty transferable to a new owner that includes the following:
 - A. Refund of the cost of equipment and installation should the System continue in failure as described in 310 CMR 15.303(1)(a)(1) and (2) after 180 days of

operation that is conducted in accordance with the Company's specifications and oversight; or

- B. Refund of the cost of equipment and installation should the System fail as described in 310 CMR 15.303(1)(a)(1) and (2) within two years of installation provided that the System owner has entered into and maintained an operation and maintenance contract with the Company and has operated the System in accordance with the Company's specifications.
8. The Company shall conduct a performance evaluation starting after the first 100 systems have been installed and operating for at least one year. A report shall be submitted to the Department no more than 180 days beyond the one year period evaluating whether at least 90 percent of the units installed for at least one year have demonstrated a reduction in depth and that the reduction in depth of the effluent elevation for the SAS systems has occurred within 180 days of start-up or that ponding elevations in any new SAS systems are not excessive. Should the System not demonstrate the capability to reduce or eliminate ponding in 90 percent of the failed systems, the report shall detail the changes that must be made in site evaluation, design, installation, and/or operation or maintenance to meet the goal and shall include a schedule containing a deadline for implementing those changes. The Department reserves the right to limit the number of installations to 100 systems based on the Department's interpretation of data available at any time. After 50 Systems have been installed, should the performance results indicate that less than 90 percent of the installed Systems are no longer in failure, the Department will limit the number of Systems to no more than 100 until a performance report indicating that over 90 percent of the Systems are no longer in failure has been completed.
9. The Company shall include copies of this Approval and the procedures and protocol described in Section VI (1) with each System that is sold. In any contract executed by the Company for distribution or re-sale of the System, the Company shall require the distributor or re-seller to provide each purchaser of the System with copies of this Approval and the procedures and protocol described in Section VI (1).
10. The Company shall notify the Director of the Watershed Permitting Program at least 30 days in advance of the proposed transfer of ownership of the technology for which this Approval issued. Said notification shall include the name and address of the proposed new owner and a written agreement between the existing and proposed new owner containing a specific date for transfer of ownership, responsibility, coverage and liability between them. All provisions of this Approval applicable to the Company shall be applicable to successors and assigns of the Company, unless the Department determines otherwise.
11. The Company shall furnish the Department any information that the Department requests regarding the System within 21 days of the receipt of that request.
12. If the Company wishes to continue this Approval after its expiration date, the Company shall apply for and obtain a renewal of this Approval. The Company shall submit a renewal application at least 180 days before the expiration date of this Approval, unless written permission for a later date has been granted in writing by the

Department. This approval shall continue in force until the Department has acted on the renewal application.

VII. Reporting

1. All notices and documents required to be submitted to the Department by this Approval shall be submitted to:

Director
Watershed Permitting Program
Department of Environmental Protection
One Winter Street - 6th floor
Boston, Massachusetts 02108

VIII. Rights of the Department

1. The Department may suspend, modify or revoke this Approval for cause, including, but not limited to, non-compliance with the terms of this Approval, inadequate system performance demonstrated by the annual report required in Section VI (2) or other relevant information, non-payment of the annual compliance assurance fee, for obtaining the Approval by misrepresentation or failure to disclose fully all relevant facts or any change in or discovery of conditions that would constitute grounds for discontinuance of the Approval, or as necessary for the protection of public health, safety, welfare or the environment, and as authorized by applicable law. The Department reserves its rights to take any enforcement action authorized by law with respect to this Approval and/or the System against the owner, or operator of the System and/or the Company.

IX. Expiration Date

1. Notwithstanding the expiration date of this Approval, any System sold and installed prior to the expiration date of this Approval, and approved, installed and maintained in compliance with this Approval (as it may be modified) and 310 CMR 15.000, may remain in use unless the Department, the local approving authority, or a court requires the System to be modified or removed, or requires discharges to the System to cease.